

100

Sprites the easy way with the 64



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Software society

Continued from front page

■ When discussing royalty payments, a software house said it would like only 100 percent but says that when total returns alone had taken 1,000

■ The heads of two software companies were talking about licence releases when they discovered that each was planning to bring out the same game. One school boy had submitted the program under different names.

Through the CTA, the society could lobby the Government on subjects like grants and rent and rate rebates for fledgling industries.

In private development grants started in 1980-81 and went for big projects. What was needed was a revamped scheme for those who needed only pocket £1,000 to buy a couple of computers.

Mr Rankin said: "We have the industrial situation where one of our members has got what everyone agrees is a good product and it costs £1,000 to finish it off over the next six months."

"But because the figure is so small, you can't get the money. And even if he could it would take eight or nine months to come through under the present arrangements."

The subscription to the new group will depend on how it is set up — as a sub-group of the CTA, an associate, like the earlier (former Group of Software Houses), or affiliated.

The CTA now has a membership of 154, with 60 applications going through, and the annual subscription is £35.

Mr Rankin said the CTA and a dozen through which various parts of the industry can talk to each other, particularly now another group is being set up.

This will be called the Society of Small Micro Owners and is being established by Barry Jones, of Microcom.

Other points from the meeting:

■ The CTA may join with Personal Computer Services, a distribution company, to produce fortnightly charts of best-selling software.

■ A proposed licensing scheme for used under purchase may be extended to cover rental sales in a similar way to the protection scheme run by the industry, set up by the Association of British Travel Agents.

■ The CTA may encourage the setting up of an investment trust

to a channel for speculative investments.

■ From the end of October, there will be a CTA register of software sales as a free service to members who wish to check that the names of games are not already being used and so establish their titles. It would act only as an information service as copies are at present registered with the Patent Office. Computer Trade Association, 268 Marston Street, Chislehurst, Essex SSO 2LS.

Cable

Continued from front page

Prime Chandler, systems manager of the home computer division of ThornEMI Video, and his company had customers at work but field tests had not yet begun.

He said it would, as a means of distributing ThornEMI's own software at a price cheaper than cartridge.

He said: "I see it as another premium channel that cable TV operators can offer to subscribers."

"We would put up a range of rates — not just games but educational and home management as well — totalling by 20 per cent each month."

"It's very important that people get the best and greatest. It's the same with video — you can't offer films that are eight years old."

"And we will be making sure that you will be able to transfer it onto cassette or disc."

Mr Chandler expected a number of systems to be on offer by late next year. Did he see the competition from W H Smith as a threat?

He said: "I don't know what you mean. I think the home computer is a good thing. There will be a lot around, but ours will be broadly-based and better software."

The service would ensure that subscribers were only offered the "meat" of software for their own computer.

ThornEMI already runs Scan don't miss radio TV service and is one of the companies building for Lagenor.

Subscribers who sign up for the W H Smith service will get a U.S. designed 64K computer with a transparently keyboard. Both sides of the keyboard will be five-megabyte — to allow two-player games — along with facilities for joystick and video disc.

The computer, now being adapted for the UK, will be pro-

grammable by the user and can accept software as used in.

Deek Ruffell, manager of corporate planning and development for W H Smith, said: "What differentiates this service from the others in America is that you don't have to provide a computer. One operator requests you to spend £24 dollars on a machine."

"With ours you do not have to buy any machine at all."

Black cable operator would have two mini-computers — plus a smaller one to add and delete subscribers — linked to a large W H Smith base computer which would feed the operators and monitor use.

He could give no estimate on the cost to the subscribers, saying: "If you sell anything it's got to relate to the retail end, in this case, to the level of penetration."

Although at first the software on offer would be mainly American-based "We think it's important that there's a UK content."

Was two-way cable system the possibility without.

Mr Ruffell said: "We have been asked by several areas and potential cable operators about tele-chessing."

He said that the company's principal interest at present was to recruit cable operators to taking the service — there would be no need to appeal to subscribers.

One possibility was that, as in America, new games would be licensed from and more licenses for the exclusive use of subscribers, two months before they were on stand sale.

To prevent piracy, each subscriber's computer would have a unique code. Software would only load if this code was present.

And, with an interactive screen, there would even be a check on theft. If the last customer would check if the subscriber's computer was present.

And, as a further development, each address would be searched to the computer's code number. So if the computer was moved out door and plugged into a neighbour's cable it would be noticed and warned.

ThornEMI Video, ThornEMI House, Upper St Martin's Lane, London WC2H 9ED.
W H Smith and Son, Broad House, 20 New Street Lane, London EC4A 3AD.

You could be on our pages

We welcome program articles and tips from our readers.

PROGRAMS should, if possible, be computer printed to a width of 40 characters (use a new ribbon) and for sent in cassette. Check carefully that they are bug-free, include details of what your program does, how it works, variables you have used and hints on conversion.

ARTICLES on using home computers should be no longer than 2,000 words. Don't worry about your writing ability — just try to keep to the style in title. Articles most likely to be published will help our readers make better use of their money by giving useful hints, possibly with program examples, we will convert any sketches/illustrations into finished artwork.

TIPS are short articles, and brief programming routines which we can put together with others. Your hints can aid other computer users.

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Keep a copy of your submissions and include an SAE if you want them returned. Label everything clearly and give a daytime and home phone number if you can.

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Buy a micro — for the future

Recently Lynda Carter argued in these columns that home computing should be kept for those with specific applications in mind. I couldn't disagree more — I think, more so, as an excellent preparation for the society of the future, and the more people that have them, the better.

Don't get me wrong. I'm not saying that I think that there will be a growing demand for computer professionals, and that all the people currently doing their jobs as traditional workers will be able to retain and get jobs in computing, or start their own software companies and become millionaires.

For a start, though home computing is certainly booming, there isn't that much demand for software. And secondly, at some point, computers will eventually take a lot of the work out of programming. That is already happening — companies like Perot are commissioning code to speed up their program development.

These tools will themselves get cheaper, as more varied job ranges, and larger software ranges start labouring writing software into programs from scratch will be a thing of the past — a big idea building a car by working all of the components individually for itself.

Now would I recommend as soon as I buy a micro because it will help them to come to terms with the new technology that it represents? I guess it's difficult to tell that over the next five years. That's before the computer becomes a bit of recent public awareness enters the Academic Technology Award and the National Schools project, and I think it's reasonable.

Well, I believe the whole point of a lot of the improvements currently being made in computer systems is to make them easier to come to terms with. At the moment, you need to be able to use a keyboard and understand a programming language to communicate with computers.

But in a few years, advances in speech synthesis and speech input will mean that you will be able to speak to your computer directly — and all that disabling you is right, not the other way round. At the moment, you need to use a keyboard, a mouse, a joystick, a light pen, a "mouse" and a graphics tablet will make it easier and easier to use new technology.

So if you're not yet into it and it won't help you progress with new technology, why am I saying that everyone should have a micro? Simply because, like it or not, we're all going to have to get used to it, or at least become more so. Computers are going to be able to take up a lot of the jobs that the public currently do, and even those that think enough jobs are going to be created to make up for the old jobs that will be lost or be for a very small part.

To fill all that free time, we're going to have to find plenty of stimulating and absorbing hobbies that will provide the mental stimulation and challenge to stop us starting into computer hobbies. And we're going to have to find education in what needs to fill our time more seriously than a hobby.

Home programming for the best people. It demands concentration, logic and memory. It doesn't change your health, a family quarrel, and after the initial setup, doesn't cost much.

Why doesn't it? It's a computer rather than a big program running on a mainframe or a big working on a production line.

Jo Wilson
Teacher
Liverpool, Merseyside

a This space is for you to respond off stage the above comments to persons these comments in last columns. (There's just time for sending them to Paul Upston, Opinion, Home Computing Weekly, 165 Charing Cross Road, London WC2H 8BH. Please include your telephone and your internet connection.

Books and software get together

Publishing giant McGraw-Hill has turned its attention to home computer users, with a series of linked books and software.

For young ZX81 owners, Z801/TS1000 Programming for Young Programmers and its companion cassette Z801/TS1000 Programs for Young Programmers aim to teach the rudiments of BASIC programming.

Aimed at children of nine years upwards, a new games and mathematics mathematics package.

In addition to Linda Hurley, a housewife with two young children who are themselves learning about computers. The book costs £4.95 and the software £3.95.

Profile 1 is a disk Spectrum spreadsheet program for local numbers and are, intended for home and business use. It comes with a 12-page manual and software support service, and costs £9.95. A linked book in the next issue.

Finally, there's a full-function Z80 Assembler for business machine code programmers. It costs £9.95, and a related book on assembly language program will follow.

Extra memory for TI-99/4A

QA Data Systems has brought out a 128K RAM pack for the TI-99/4A, which gives you 96 of directly-addressable RAM for machine-code programming.

It's sold along with an adaptor unit giving memory ports and a power supply, for £20. The adaptor alone costs £8. Q4, 9 St George's Street, Chelmsley, Lancs PA7 5AA.

Other books and software are coming soon, covering subjects from advanced games to word processing.

McGraw-Hill, Shagwell Road, Maidenhead, Berks SL6 7PA.

First time users — it's a bargain

If you buy a £541 and 16K RAMpack during the next couple of months, you'll save an astonishing £30. Sinclair is offering a starter pack containing the ZXS1, RAMpack and the cassette for just £45.

Normally the ZXS1 costs £40, the 16K Sinclair RAMpack costs £30, and software cassettes cost around £5.

Added to a starting time offer, the offer will last initially for two months. It is available from such Sinclair stockists, including Haver and John Haver.

And if you're thinking of buying a printer for your ZXS1 or Spectrum, Sinclair is also offering the free trial of printer packages every 28 printer bought during the period. Sinclair, Ashton, 21 White Road, Cambridge CB2 2AG.

The show the Scots are waiting for

If you live in Scotland, here's a date for your diary. The first Scottish Home Computer and Electronics Show is planned for 4-6 November, and will take place in the Aberdeen Exhibition Centre, Glasgow.

There'll be rooms for 96 stands with home computers, peripherals and software as well as a variety of other electronic equipment. Details: Lishman, 100 Broad, 10/11 Constitution Street, Craig, Aberdeen AB9 4DA.

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TI-99/4A PROGRAM

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010 G=1
020 C0=97
030 GOTO 999
040 IF P<1000 THEN 950
050 Y=0
060 M=0
070 C0=99
080 REM MOVE CAR
090 B=99
100 C=0
110 IF P<1000 THEN 1000
120 CALL COMBINE C,B,P
130 CALL MONITOR DE 110
1400 CALL MONITOR DE 110
1500 REM CAR OFF TRACK
1600 IF OFF=100 THEN 700
1700 IF OFF=100 THEN 1100
1800 C=C+1
1900 CALL SCREEN(7)
2000 CALL SOUND(400,-7,1)
2100 CALL SCREEN(2)
2200 GOTO 700
2300 REM FINISH
2400 FOR I=100 TO 1100 STEP 100
2500 CALL SOUND(400,5,1)
2600 NEXT I
2700 IF OFF=100 THEN 1300
2800 C=C+1
2900 CALL SCREEN(7)
3000 CALL SOUND(400,-7,1)
3100 CALL SCREEN(2)
3200 GOTO 700
3300 REM FINISH
3400 FOR I=100 TO 1100 STEP 100
3500 CALL SOUND(400,5,1)
3600 NEXT I

```

```

1100 CALL CLEAR
1200 REM SCORE COUNT
1300 IF 1000=1000 THEN 1300 ELSE 1170
1400 B0=C0
1500 PRINT TAB(3); "YOU HIT " B0 " TREE"
1600 PRINT TAB(3); "NEXT RUN 20 RUN IS " B0
1700 PRINT TAB(3); "THA AGAIN? (Y/N)"
1800 CALL SCREEN(5)
1900 IF B1 THEN 1200
2000 IF B0=0 THEN 400
2100 IF B0=0 THEN 1000 ELSE 1100
2200 FOR I=100 TO 110 STEP 100
2300 CALL SOUND(400,5,1)
2400 NEXT I
2500 CALL CLEAR
2600 PRINT "YOU DROVE OUT OF THE FOREST."
2700 GOTO 1100
2800 DATA 4,4,5,5,14,8,4,21,5,8 27,9,10,28,
2900 5,9,16,9,28,16 13,22,14,23,28,7,8,15,
3000 4,2
3100 DATA 9,10,2,3,28,2,4,28,5,4,28,5,5,15,
3200 4,3,15,8,16,28,7,21,13,2,28,13,2,15,8
3300 5,8,9,8
3400 END
3500 REM "PRINT BY" ROOM
3600 FOR I=1 TO 1000
3700 REM SCREEN(1) 1
3800 CALL SCREEN(1) C=1,0
3900 NEXT I
4000 RETURN

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Want to design your own graphics character but don't know how?

Then don't miss your FREE PCT SHAPE MAKER in our October issue! This specially designed grid tells you how to draw up your own individually created graphics characters on this PCT card.

You can make unlimited use of the PCT SHAPE MAKER because the card's surface can be written on and wiped off, once you have incorporated your character into your program.

To make your programs more visually exciting make sure to get your copy of PERSONAL COMPUTING TODAY.

On sale at newsagents from September 2.

How to hit the pools jackpot with your Spectrum

Will 1985/86 be your season for a big win on the football pools? With the new season just starting, this article shows how you can get a 48K Spectrum to help you with that win.

Home computers can easily cost thousands of calculations a minute. And that's just what you need to study in the facts of football clubs if you want to try and predict the outcome of games. If lucky, it will do that for you.

However, there really big wins on the pools depend on the unpredictable happening — those games which are not expected to be drawn ending as score draws.

No computer can predict these results, you depend only on luck, picking numbers at random. For this, you don't really need a computer, but it can make it get your selections (14K, or 48K) you can use in Listing 1.

When you RUN the program, first select the options: all numbers say were between 1 and 48 (the number of matches on a football coupon), and the computer will fill six boxes of random numbers on the left side of the screen, then sort them, and print the sorted list on the right side.

If you want to increase your chances of winning a more modest amount, then Listings 2 and 3 should help you.

Listing 2 creates a data file for you, and deals with programmes and algorithms for sorting them. The data file generated is used by Listing 3 to predict the outcome of matches based on the data in data.

You will need to keep the data base up-to-date if the program is to have some reliability. This will mean deleting last three years' past week starting results. If that hasn't got you all, then type in the two programs, SAVE them and I'll explain how they work.

RUN the program in Listing 2. It goes through all four divisions of the English league, then the three of the Scottish league, asking you to enter the names of the teams. Once you have entered all the names in one division you have the option to correct any errors.

Then the names are sorted into alphabetical order, and moved in the file. Once you've entered all the names, the program will data is moved on tape for use at the end of the season, when teams are moved between divisions in promotion and relegation.

When you reload this program, it will automatically scan the programme's integrity and routines, and the on-screen instructions are self-explanatory.

With the new soccer season about to start, David Nowotalk presents three programs for the 48K Spectrum which could help you win a fortune

While the program and data file from Listing 1 is your computer, 48K RLE the program in Listing 2 and 3. This effectively stores all the program data of the file crea-

tion program, but because the data is now the prediction program. Scan it with GOTD 40, the converted RLE will come off the disk.



The prediction program is more driven, with three main options.

The first allows you to enter results to maintain your data base. To enter results, select option 1 from the main menu, then select the league you require. All the teams in that league are shown on the screen. Enter the numbers alongside the home and away teams respectively, and the score. The score is entered at the end of the line, e.g. enter 20 for a score of 2-0.

The computer will for confirmation then the information is correct. If yes, then the results are stored. The next question on the screen is "Data more?" If you want to enter more results from the same division say yes, otherwise no.

Try to enter results in chronological order, and keep your file up-to-date for reliability in the second option, the prediction of results.

When you select this option you first have to enter the 25 matches on the coupon. The instructions on the screen should be followed. Once all matches have been entered, the computer spends a few minutes doing lots of calculations.

Once complete, the computer prints out 20 matches on the screen in order of the most likely result on a draw. The figures on the right hand side of the screen indicate the likelihood of a draw, the closer to zero, then the greater the chance of a drawn result.

At last, that's what the computer thinks.

Speed does not permit an explanation of how the computer comes to its conclusion, and leave you to work that out for yourself, if you wish. When all the 20 matches are displayed on the screen, pressing "n" will give you a copy on the printer, providing any other key returns you to the main menu.

The third option is to save the program and data. Use the when you have entered all the week's results and predicted next week's draws. When you reload the program the following week, you are ready to start all over again.

You will need to have at least four matches played per team before you can start to predict results.

Therefore, enter results and save the data only for the first four weeks of the season. You'll be ready to start predicting draws, long before I'm out of paper!

If you wish using this program, send me your name and address, so I'll know where to send the begging letter!

SPECTRUM PROGRAM

Listing 1 - Locks number generator

```

10 REM Locks Number Generator
20 REM by David Hordstall
30 REM July, 1983
40 REM
50 REM PRINT AT 0.0: FLASH L"LOCK
Y NUMBER GENERATOR"
60 PRINT AT 0.0: "FOR EACH RUN
70 GO SUB 1000
80 IF 1/1 OR 1/10 OR 1/100 THEN 1
90 GO TO 70
100 DIM A$(100)
110 CLS
120 PRINT AT 0.0: "O.K. - H
130 FOR I=1 TO 100
140 FOR J=1 TO 10
150 IF A$(I+J-1) THEN GO TO 11
160 LET A$(I+J-1)=CHR$ I
170 NEXT J
180 NEXT I
190 PRINT AT 0.0: "
200 IF 1/1 THEN GO TO 2
210 FOR I=1 TO 1
220 FOR J=1 TO 1
230 IF A$(I+J-1) THEN GO TO 2
240 LET A$(I+J-1)=CHR$ I
250 NEXT J
260 NEXT I
270 PRINT AT 0.0: "Sorted -
280 FOR I=1 TO 1
290 PRINT AT 0.0: "O.K.
300 NEXT I

```

Listing 2 - File creation program

```

10 REM Peeps Forebears
20 REM by David Hordstall
30 REM July, 1983
40 REM
50 REM File Creation Program
60 DIM A$(100)
70 DIM B$(100)
80 DIM C$(100)
90 DIM D$(100)
100 DIM E$(100)
110 DIM F$(100)
120 DIM G$(100)
130 DIM H$(100)
140 DIM I$(100)
150 DIM J$(100)
160 DIM K$(100)
170 DIM L$(100)
180 DIM M$(100)
190 DIM N$(100)
200 DIM O$(100)
210 DIM P$(100)
220 DIM Q$(100)
230 DIM R$(100)
240 DIM S$(100)
250 DIM T$(100)
260 DIM U$(100)
270 DIM V$(100)
280 DIM W$(100)
290 DIM X$(100)
300 DIM Y$(100)
310 DIM Z$(100)
320 DIM AA$(100)
330 DIM AB$(100)
340 DIM AC$(100)
350 DIM AD$(100)
360 DIM AE$(100)
370 DIM AF$(100)
380 DIM AG$(100)
390 DIM AH$(100)
400 DIM AI$(100)
410 DIM AJ$(100)
420 DIM AK$(100)
430 DIM AL$(100)
440 DIM AM$(100)
450 DIM AN$(100)
460 DIM AO$(100)
470 DIM AP$(100)
480 DIM AQ$(100)
490 DIM AR$(100)
500 DIM AS$(100)
510 DIM AT$(100)
520 DIM AU$(100)
530 DIM AV$(100)
540 DIM AW$(100)
550 DIM AX$(100)
560 DIM AY$(100)
570 DIM AZ$(100)
580 DIM BAA$(100)
590 DIM BAB$(100)
600 DIM BAC$(100)
610 DIM BAD$(100)
620 DIM BAE$(100)
630 DIM BAB$(100)
640 DIM BAB$(100)
650 DIM BAB$(100)
660 DIM BAB$(100)
670 DIM BAB$(100)
680 DIM BAB$(100)
690 DIM BAB$(100)
700 DIM BAB$(100)
710 DIM BAB$(100)
720 DIM BAB$(100)
730 DIM BAB$(100)
740 DIM BAB$(100)
750 DIM BAB$(100)
760 DIM BAB$(100)
770 DIM BAB$(100)
780 DIM BAB$(100)
790 DIM BAB$(100)
800 DIM BAB$(100)
810 DIM BAB$(100)
820 DIM BAB$(100)
830 DIM BAB$(100)
840 DIM BAB$(100)
850 DIM BAB$(100)
860 DIM BAB$(100)
870 DIM BAB$(100)
880 DIM BAB$(100)
890 DIM BAB$(100)
900 DIM BAB$(100)
910 DIM BAB$(100)
920 DIM BAB$(100)
930 DIM BAB$(100)
940 DIM BAB$(100)
950 DIM BAB$(100)
960 DIM BAB$(100)
970 DIM BAB$(100)
980 DIM BAB$(100)
990 DIM BAB$(100)
1000 DIM BAB$(100)

```

```

110 FOR J=1 TO 10: FOR I=0 TO 9:
120 IF A$(I+J-1) THEN GO TO 4
130 LET A$(I+J-1)=CHR$ I
140 NEXT I
150 NEXT J
160 PRINT AT 0.0: "Press any key
170 TO continue"
180 CLS
190 PRINT AT 0.0: "Press any key
200 TO continue"
210 CLS
220 PRINT AT 0.0: "Press any key
230 TO continue"
240 CLS
250 PRINT AT 0.0: "Press any key
260 TO continue"
270 CLS
280 PRINT AT 0.0: "Press any key
290 TO continue"
300 CLS
310 PRINT AT 0.0: "Press any key
320 TO continue"
330 CLS
340 PRINT AT 0.0: "Press any key
350 TO continue"
360 CLS
370 PRINT AT 0.0: "Press any key
380 TO continue"
390 CLS
400 PRINT AT 0.0: "Press any key
410 TO continue"
420 CLS
430 PRINT AT 0.0: "Press any key
440 TO continue"
450 CLS
460 PRINT AT 0.0: "Press any key
470 TO continue"
480 CLS
490 PRINT AT 0.0: "Press any key
500 TO continue"
510 CLS
520 PRINT AT 0.0: "Press any key
530 TO continue"
540 CLS
550 PRINT AT 0.0: "Press any key
560 TO continue"
570 CLS
580 PRINT AT 0.0: "Press any key
590 TO continue"
600 CLS
610 PRINT AT 0.0: "Press any key
620 TO continue"
630 CLS
640 PRINT AT 0.0: "Press any key
650 TO continue"
660 CLS
670 PRINT AT 0.0: "Press any key
680 TO continue"
690 CLS
700 PRINT AT 0.0: "Press any key
710 TO continue"
720 CLS
730 PRINT AT 0.0: "Press any key
740 TO continue"
750 CLS
760 PRINT AT 0.0: "Press any key
770 TO continue"
780 CLS
790 PRINT AT 0.0: "Press any key
800 TO continue"
810 CLS
820 PRINT AT 0.0: "Press any key
830 TO continue"
840 CLS
850 PRINT AT 0.0: "Press any key
860 TO continue"
870 CLS
880 PRINT AT 0.0: "Press any key
890 TO continue"
900 CLS
910 PRINT AT 0.0: "Press any key
920 TO continue"
930 CLS
940 PRINT AT 0.0: "Press any key
950 TO continue"
960 CLS
970 PRINT AT 0.0: "Press any key
980 TO continue"
990 CLS
1000 PRINT AT 0.0: "Press any key

```

SPECTRUM PROGRAM

```

3250 FOR S=1 TO N1
3260 LET S=ABS(12)*COS(1-1)
3270 LET S=ABS(12)*COS(1-1)+ABS(12)+
3280 ABS(12)+1
3290 NEXT S
3300 RETURN
3310 FOR S=1 TO N1+1
3320 IF S=1 THEN PRINT 0
3330 T=12.5-TAB(12.5*ABS(12)+1)+1.7
3340 GO TO 3350
3350 T=12.5-TAB(12.5*ABS(12)+1)+1.7
3360 GO TO 3350
3370 T=12.5-TAB(12.5*ABS(12)+1)+1.7
3380 GO TO 3350
3390 RETURN
3400 PRINT AT 2.2,12.5
3410 IF S=1 THEN LET T=0
3420 LET T=12.5-TAB(12.5*ABS(12)+1)+1.7
3430 INPUT "Enter the number of
3440 changes: " C
3450 IF C=0 THEN RETURN
3460 IF C=1 THEN GO TO 3480
3470 GO TO 3480
3480 PRINT AT 2.2, "Enter number
3490 of lines removed: "
3500 INPUT L
3510 IF L=1 OR L=2 OR L=3
3520 THEN GO TO 3530
3530 PRINT AT 2.2, "Enter the no
3540 of lines: "
3550 INPUT L
3560 LET L=L/2
3570 GO SUB 3580
3580 PRINT L
3590 RETURN

```

Listing 2 — Prediction program

```

10 REM POOL FORECAST
20 REM by David Goodwill
30 REM
40 REM Main Program
50 REM
60 DIM S(12)
70 DIM S(12)
80 DIM S(12)
90 DIM S(12)
100 PRINT AT 2.2, "PAPER 3: " PO
110 PRINT AT 2.2, "PAPER 3: " PO
120 PRINT AT 2.2, "PAPER 3: " PO
130 PRINT AT 2.2, "PAPER 3: " PO
140 PRINT AT 2.2, "PAPER 3: " PO
150 PRINT AT 2.2, "PAPER 3: " PO
160 PRINT AT 2.2, "PAPER 3: " PO
170 PRINT AT 2.2, "PAPER 3: " PO
180 PRINT AT 2.2, "PAPER 3: " PO
190 PRINT AT 2.2, "PAPER 3: " PO
200 PRINT AT 2.2, "PAPER 3: " PO
210 PRINT AT 2.2, "PAPER 3: " PO
220 PRINT AT 2.2, "PAPER 3: " PO
230 PRINT AT 2.2, "PAPER 3: " PO
240 PRINT AT 2.2, "PAPER 3: " PO
250 PRINT AT 2.2, "PAPER 3: " PO
260 PRINT AT 2.2, "PAPER 3: " PO
270 PRINT AT 2.2, "PAPER 3: " PO
280 PRINT AT 2.2, "PAPER 3: " PO
290 PRINT AT 2.2, "PAPER 3: " PO
300 PRINT AT 2.2, "PAPER 3: " PO
310 PRINT AT 2.2, "PAPER 3: " PO
320 PRINT AT 2.2, "PAPER 3: " PO
330 PRINT AT 2.2, "PAPER 3: " PO
340 PRINT AT 2.2, "PAPER 3: " PO
350 PRINT AT 2.2, "PAPER 3: " PO
360 PRINT AT 2.2, "PAPER 3: " PO
370 PRINT AT 2.2, "PAPER 3: " PO
380 PRINT AT 2.2, "PAPER 3: " PO
390 PRINT AT 2.2, "PAPER 3: " PO
400 PRINT AT 2.2, "PAPER 3: " PO
410 PRINT AT 2.2, "PAPER 3: " PO
420 PRINT AT 2.2, "PAPER 3: " PO
430 PRINT AT 2.2, "PAPER 3: " PO
440 PRINT AT 2.2, "PAPER 3: " PO
450 PRINT AT 2.2, "PAPER 3: " PO
460 PRINT AT 2.2, "PAPER 3: " PO
470 PRINT AT 2.2, "PAPER 3: " PO
480 PRINT AT 2.2, "PAPER 3: " PO
490 PRINT AT 2.2, "PAPER 3: " PO
500 PRINT AT 2.2, "PAPER 3: " PO
510 PRINT AT 2.2, "PAPER 3: " PO
520 PRINT AT 2.2, "PAPER 3: " PO
530 PRINT AT 2.2, "PAPER 3: " PO
540 PRINT AT 2.2, "PAPER 3: " PO
550 PRINT AT 2.2, "PAPER 3: " PO
560 PRINT AT 2.2, "PAPER 3: " PO
570 PRINT AT 2.2, "PAPER 3: " PO
580 PRINT AT 2.2, "PAPER 3: " PO
590 PRINT AT 2.2, "PAPER 3: " PO
600 PRINT AT 2.2, "PAPER 3: " PO
610 PRINT AT 2.2, "PAPER 3: " PO
620 PRINT AT 2.2, "PAPER 3: " PO
630 PRINT AT 2.2, "PAPER 3: " PO
640 PRINT AT 2.2, "PAPER 3: " PO
650 PRINT AT 2.2, "PAPER 3: " PO
660 PRINT AT 2.2, "PAPER 3: " PO
670 PRINT AT 2.2, "PAPER 3: " PO
680 PRINT AT 2.2, "PAPER 3: " PO
690 PRINT AT 2.2, "PAPER 3: " PO
700 PRINT AT 2.2, "PAPER 3: " PO
710 PRINT AT 2.2, "PAPER 3: " PO
720 PRINT AT 2.2, "PAPER 3: " PO
730 PRINT AT 2.2, "PAPER 3: " PO
740 PRINT AT 2.2, "PAPER 3: " PO
750 PRINT AT 2.2, "PAPER 3: " PO
760 PRINT AT 2.2, "PAPER 3: " PO
770 PRINT AT 2.2, "PAPER 3: " PO
780 PRINT AT 2.2, "PAPER 3: " PO
790 PRINT AT 2.2, "PAPER 3: " PO
800 PRINT AT 2.2, "PAPER 3: " PO
810 PRINT AT 2.2, "PAPER 3: " PO
820 PRINT AT 2.2, "PAPER 3: " PO
830 PRINT AT 2.2, "PAPER 3: " PO
840 PRINT AT 2.2, "PAPER 3: " PO
850 PRINT AT 2.2, "PAPER 3: " PO
860 PRINT AT 2.2, "PAPER 3: " PO
870 PRINT AT 2.2, "PAPER 3: " PO
880 PRINT AT 2.2, "PAPER 3: " PO
890 PRINT AT 2.2, "PAPER 3: " PO
900 PRINT AT 2.2, "PAPER 3: " PO
910 PRINT AT 2.2, "PAPER 3: " PO
920 PRINT AT 2.2, "PAPER 3: " PO
930 PRINT AT 2.2, "PAPER 3: " PO
940 PRINT AT 2.2, "PAPER 3: " PO
950 PRINT AT 2.2, "PAPER 3: " PO
960 PRINT AT 2.2, "PAPER 3: " PO
970 PRINT AT 2.2, "PAPER 3: " PO
980 PRINT AT 2.2, "PAPER 3: " PO
990 PRINT AT 2.2, "PAPER 3: " PO

```

```

410 PRINT AT 2.2, "PAPER 3: " PO
420 PRINT AT 2.2, "PAPER 3: " PO
430 PRINT AT 2.2, "PAPER 3: " PO
440 PRINT AT 2.2, "PAPER 3: " PO
450 PRINT AT 2.2, "PAPER 3: " PO
460 PRINT AT 2.2, "PAPER 3: " PO
470 PRINT AT 2.2, "PAPER 3: " PO
480 PRINT AT 2.2, "PAPER 3: " PO
490 PRINT AT 2.2, "PAPER 3: " PO
500 PRINT AT 2.2, "PAPER 3: " PO
510 PRINT AT 2.2, "PAPER 3: " PO
520 PRINT AT 2.2, "PAPER 3: " PO
530 PRINT AT 2.2, "PAPER 3: " PO
540 PRINT AT 2.2, "PAPER 3: " PO
550 PRINT AT 2.2, "PAPER 3: " PO
560 PRINT AT 2.2, "PAPER 3: " PO
570 PRINT AT 2.2, "PAPER 3: " PO
580 PRINT AT 2.2, "PAPER 3: " PO
590 PRINT AT 2.2, "PAPER 3: " PO
600 PRINT AT 2.2, "PAPER 3: " PO
610 PRINT AT 2.2, "PAPER 3: " PO
620 PRINT AT 2.2, "PAPER 3: " PO
630 PRINT AT 2.2, "PAPER 3: " PO
640 PRINT AT 2.2, "PAPER 3: " PO
650 PRINT AT 2.2, "PAPER 3: " PO
660 PRINT AT 2.2, "PAPER 3: " PO
670 PRINT AT 2.2, "PAPER 3: " PO
680 PRINT AT 2.2, "PAPER 3: " PO
690 PRINT AT 2.2, "PAPER 3: " PO
700 PRINT AT 2.2, "PAPER 3: " PO
710 PRINT AT 2.2, "PAPER 3: " PO
720 PRINT AT 2.2, "PAPER 3: " PO
730 PRINT AT 2.2, "PAPER 3: " PO
740 PRINT AT 2.2, "PAPER 3: " PO
750 PRINT AT 2.2, "PAPER 3: " PO
760 PRINT AT 2.2, "PAPER 3: " PO
770 PRINT AT 2.2, "PAPER 3: " PO
780 PRINT AT 2.2, "PAPER 3: " PO
790 PRINT AT 2.2, "PAPER 3: " PO
800 PRINT AT 2.2, "PAPER 3: " PO
810 PRINT AT 2.2, "PAPER 3: " PO
820 PRINT AT 2.2, "PAPER 3: " PO
830 PRINT AT 2.2, "PAPER 3: " PO
840 PRINT AT 2.2, "PAPER 3: " PO
850 PRINT AT 2.2, "PAPER 3: " PO
860 PRINT AT 2.2, "PAPER 3: " PO
870 PRINT AT 2.2, "PAPER 3: " PO
880 PRINT AT 2.2, "PAPER 3: " PO
890 PRINT AT 2.2, "PAPER 3: " PO
900 PRINT AT 2.2, "PAPER 3: " PO
910 PRINT AT 2.2, "PAPER 3: " PO
920 PRINT AT 2.2, "PAPER 3: " PO
930 PRINT AT 2.2, "PAPER 3: " PO
940 PRINT AT 2.2, "PAPER 3: " PO
950 PRINT AT 2.2, "PAPER 3: " PO
960 PRINT AT 2.2, "PAPER 3: " PO
970 PRINT AT 2.2, "PAPER 3: " PO
980 PRINT AT 2.2, "PAPER 3: " PO
990 PRINT AT 2.2, "PAPER 3: " PO

```

SPECTRUM PROGRAM

```

0000 GOTO 00000
0010 PRINT AT 10,1: " Take a whi
0020 " 1000 1010"
0030 PRINT " by crystal ball
0040 GOSUB 00000
0050 FOR J=1 TO 20
0060 GOSUB 00000
0070 GOSUB 00000
0080 GOSUB 00000
0090 GOSUB 00000
0100 GOSUB 00000
0110 GOSUB 00000
0120 GOSUB 00000
0130 GOSUB 00000
0140 GOSUB 00000
0150 GOSUB 00000
0160 GOSUB 00000
0170 GOSUB 00000
0180 GOSUB 00000
0190 GOSUB 00000
0200 GOSUB 00000
0210 GOSUB 00000
0220 GOSUB 00000
0230 GOSUB 00000
0240 GOSUB 00000
0250 GOSUB 00000
0260 GOSUB 00000
0270 GOSUB 00000
0280 GOSUB 00000
0290 GOSUB 00000
0300 GOSUB 00000
0310 GOSUB 00000
0320 GOSUB 00000
0330 GOSUB 00000
0340 GOSUB 00000
0350 GOSUB 00000
0360 GOSUB 00000
0370 GOSUB 00000
0380 GOSUB 00000
0390 GOSUB 00000
0400 GOSUB 00000
0410 GOSUB 00000
0420 GOSUB 00000
0430 GOSUB 00000
0440 GOSUB 00000
0450 GOSUB 00000
0460 GOSUB 00000
0470 GOSUB 00000
0480 GOSUB 00000
0490 GOSUB 00000
0500 GOSUB 00000
0510 GOSUB 00000
0520 GOSUB 00000
0530 GOSUB 00000
0540 GOSUB 00000
0550 GOSUB 00000
0560 GOSUB 00000
0570 GOSUB 00000
0580 GOSUB 00000
0590 GOSUB 00000
0600 GOSUB 00000
0610 GOSUB 00000
0620 GOSUB 00000
0630 GOSUB 00000
0640 GOSUB 00000
0650 GOSUB 00000
0660 GOSUB 00000
0670 GOSUB 00000
0680 GOSUB 00000
0690 GOSUB 00000
0700 GOSUB 00000
0710 GOSUB 00000
0720 GOSUB 00000
0730 GOSUB 00000
0740 GOSUB 00000
0750 GOSUB 00000
0760 GOSUB 00000
0770 GOSUB 00000
0780 GOSUB 00000
0790 GOSUB 00000
0800 GOSUB 00000
0810 GOSUB 00000
0820 GOSUB 00000
0830 GOSUB 00000
0840 GOSUB 00000
0850 GOSUB 00000
0860 GOSUB 00000
0870 GOSUB 00000
0880 GOSUB 00000
0890 GOSUB 00000
0900 GOSUB 00000
0910 GOSUB 00000
0920 GOSUB 00000
0930 GOSUB 00000
0940 GOSUB 00000
0950 GOSUB 00000
0960 GOSUB 00000
0970 GOSUB 00000
0980 GOSUB 00000
0990 GOSUB 00000
1000 GOSUB 00000

```

```

0000 GOTO 00000
0010 PRINT AT 10,1: " Take a whi
0020 " 1000 1010"
0030 PRINT " by crystal ball
0040 GOSUB 00000
0050 FOR J=1 TO 20
0060 GOSUB 00000
0070 GOSUB 00000
0080 GOSUB 00000
0090 GOSUB 00000
0100 GOSUB 00000
0110 GOSUB 00000
0120 GOSUB 00000
0130 GOSUB 00000
0140 GOSUB 00000
0150 GOSUB 00000
0160 GOSUB 00000
0170 GOSUB 00000
0180 GOSUB 00000
0190 GOSUB 00000
0200 GOSUB 00000
0210 GOSUB 00000
0220 GOSUB 00000
0230 GOSUB 00000
0240 GOSUB 00000
0250 GOSUB 00000
0260 GOSUB 00000
0270 GOSUB 00000
0280 GOSUB 00000
0290 GOSUB 00000
0300 GOSUB 00000
0310 GOSUB 00000
0320 GOSUB 00000
0330 GOSUB 00000
0340 GOSUB 00000
0350 GOSUB 00000
0360 GOSUB 00000
0370 GOSUB 00000
0380 GOSUB 00000
0390 GOSUB 00000
0400 GOSUB 00000
0410 GOSUB 00000
0420 GOSUB 00000
0430 GOSUB 00000
0440 GOSUB 00000
0450 GOSUB 00000
0460 GOSUB 00000
0470 GOSUB 00000
0480 GOSUB 00000
0490 GOSUB 00000
0500 GOSUB 00000
0510 GOSUB 00000
0520 GOSUB 00000
0530 GOSUB 00000
0540 GOSUB 00000
0550 GOSUB 00000
0560 GOSUB 00000
0570 GOSUB 00000
0580 GOSUB 00000
0590 GOSUB 00000
0600 GOSUB 00000
0610 GOSUB 00000
0620 GOSUB 00000
0630 GOSUB 00000
0640 GOSUB 00000
0650 GOSUB 00000
0660 GOSUB 00000
0670 GOSUB 00000
0680 GOSUB 00000
0690 GOSUB 00000
0700 GOSUB 00000
0710 GOSUB 00000
0720 GOSUB 00000
0730 GOSUB 00000
0740 GOSUB 00000
0750 GOSUB 00000
0760 GOSUB 00000
0770 GOSUB 00000
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0960 GOSUB 00000
0970 GOSUB 00000
0980 GOSUB 00000
0990 GOSUB 00000
1000 GOSUB 00000

```

```

0000 GOTO 00000
0010 PRINT AT 10,1: " Take a whi
0020 " 1000 1010"
0030 PRINT " by crystal ball
0040 GOSUB 00000
0050 FOR J=1 TO 20
0060 GOSUB 00000
0070 GOSUB 00000
0080 GOSUB 00000
0090 GOSUB 00000
0100 GOSUB 00000
0110 GOSUB 00000
0120 GOSUB 00000
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0190 GOSUB 00000
0200 GOSUB 00000
0210 GOSUB 00000
0220 GOSUB 00000
0230 GOSUB 00000
0240 GOSUB 00000
0250 GOSUB 00000
0260 GOSUB 00000
0270 GOSUB 00000
0280 GOSUB 00000
0290 GOSUB 00000
0300 GOSUB 00000
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0370 GOSUB 00000
0380 GOSUB 00000
0390 GOSUB 00000
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0680 GOSUB 00000
0690 GOSUB 00000
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0940 GOSUB 00000
0950 GOSUB 00000
0960 GOSUB 00000
0970 GOSUB 00000
0980 GOSUB 00000
0990 GOSUB 00000
1000 GOSUB 00000

```

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FOR BBC

The easy way to sprite-ly programming

Create sprites on your Commodore 64 the easy way with our Sprite Mapper program, which can also be used to design your defined characters.

When you are ready to use the program, first change the screen to the background colours you wish use with the sprite, then RUN the program.

Design sprite colours, a sprite will be used to demonstrate the screen appearance. An actually you are asked to define sprite size and colour.

How it works

48,128 available space to be defined.
256-400 colour grid.
Sprites go character's first colour.
Transfer character key to the screen accordingly.
118-176 1280 your data table.
to have 256 character sets.
118-176 1280 your data table.
to have 256 character sets.

Sprites are one of the features that make the Commodore 64 so popular. David Rees' Mapper makes them simple to construct

```
5 V=256:400 CL=PEEK+400
6 REM(128)
10 PRINT" "
20 PRINT" * SPRITE MAPPER * "
30 PRINT" * 1/2 256X256 * "
35 REM(128) 256X
40 PRINT"PLEASE ENTER SPRITE MODE (1-256) "
50 INPUT"MULTICOLOUR (1-8) "
60 REM 1/2 256X256 THEN 5=0 000000
```

The display then switches to a grid of 24 by 21 rows, to multi-colours, 12 by 21.

A single character your drawing position can be moved in any direction using the cursor keys.

To draw simply press the number of the colour chosen. It will then fill the space on the grid and the demonstration sprite. Backgrounds are provided so that the cursor does not move off the grid or draw the wrong colour.

When you have finished press E. Colour and key data will fill the screen in the format of the graphic rendering screen, then done.

As data fills the whole screen, what you have saved the program may be to end, as it will appear and the screen will scroll up, blanking out data.

All data containing Commodore's special characters have a 16 Mark before them giving the details as they are, as difficult to recognise.

```
70 IF REM(128) THEN 30
80 INPUT"1/2 256X256 (1-2) "
90 REM 1/2 256X256 THEN 30 000000
100 IF REM(128) THEN 30
110 INPUT"256X256 (1-2) "
120 V=256:400 CL=PEEK+400 000000
130 IF REM(128) THEN 100
140 INPUT"COLOUR (1-256) "
150 IF REM(128) THEN 200
160 INPUT"COLOUR (1-256) "
170 INPUT"COLOUR (1-256) "
180 FOR C=1 TO 256:FOR E=1 TO 256
190 REM(128) 256X
200 REM(128) 256X
210 FOR E=1 TO 256:FOR C=1 TO 256
220 REM(128) 256X
230 REM(128) 256X
240 REM(128) 256X
250 REM(128) 256X
260 REM(128) 256X
270 REM(128) 256X
280 REM(128) 256X
290 REM(128) 256X
300 REM(128) 256X
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490 REM(128) 256X
500 REM(128) 256X
510 REM(128) 256X
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760 REM(128) 256X
770 REM(128) 256X
780 REM(128) 256X
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800 REM(128) 256X
810 REM(128) 256X
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830 REM(128) 256X
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870 REM(128) 256X
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970 REM(128) 256X
980 REM(128) 256X
990 REM(128) 256X
```

```
540 FOR E=1 TO 256:FOR C=1 TO 256
550 REM(128) 256X
560 REM(128) 256X
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580 REM(128) 256X
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610 REM(128) 256X
620 REM(128) 256X
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940 REM(128) 256X
950 REM(128) 256X
960 REM(128) 256X
970 REM(128) 256X
980 REM(128) 256X
990 REM(128) 256X
```

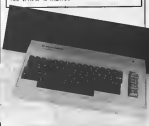


Table 1

Table 2

5. *relative neighbor*
6. *the number of vowels and, then, the number of consonants*
7. *the ratio of consonants*
8. *number of vowels in each*
9. *number of consonants in each*
10. *Levenshtein's distance*
11. *the number of keyframes*
12. *the number of keyframes*
13. *the number of keyframes*
14. *the number of keyframes*
15. *the number of keyframes*
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97. *the number of keyframes*
98. *the number of keyframes*
99. *the number of keyframes*
100. *the number of keyframes*

The object of Slalom is to push your skis down the slope, slalom around trees in the forest.

Colliding with flags could penalize points, or does going around flags in the wrong direction. If you crash three times into the flags, serious as the markers at the side of the slope you go down to hospital in an ambulance.

The game has seven skill levels, high-resolution cartoon graphics, and sound, plays music, and (if 800Kb or removed) has an on-board 1.44 MB floppy.

The game is in two parts. It is best to save the programs on tape as suggested, as each program

Panel one displays the instructions, which the graphics and music drive into the background.

H. J. ...
 ...

- [illegible]

**Ski to a
victory
tune . . . or
to a waiting
ambulance**

Slalom packs a lot into the unexpanded VIC-20, thanks to the way Mike Roberts has written his two-part program. There's seven skill levels, hi-res graphics, sound and music

memory, then loads and runs the second program. Late 19th program I check to see if all 160 items of data have been typed in correctly, so otherwise it can be hard to do data entry in times that have no data.

Part two is the actual game. The player is guided by using the **INSERT** key to move right, and the **left arrow** key to move left. If no key is pressed then the man will travel in a straight line down the screen.

You must go against the posts in the direction of the arrows or 10 penalty points are added to your score. Points are also deducted for a bad start or finish.

When the game starts you are given the option of using the course and then that of changing to a new course or course.

Happier thing and remember there is always an alternative waiting to carry your body off for some other reason. Is it still on the ground?

1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 26

- 10-15 check character and create class
- 100-120 instructions
- 200-250 lower and level
- 300-350 jump level entered to within 1000 and enter it
- 400 survey answers for characters and record data
- 500 read and enter character and create class
- 600 read and run tables part 1
- 700-1150 data for 10 rows defined characters
- 1200-1150 data for The Yellow River Basin for 10 rows

Part 1 — contractors, data for graphics and more and more and...

- [illegible]



VIC-20 PROGRAM

Part 2 — the main game program

```

1 REM ***** MAIN PROGRAM *****
2 REM *****
3 REM *****
4 REM *****
5 REM *****
6 REM *****
7 REM *****
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10 REM *****
11 REM *****
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99 REM *****
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```

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700-700 3 way, odds, evens
800-800 3 way, odds, evens
900-900 3 way, odds, evens

1000-1000 3 way, odds, evens
1100-1100 3 way, odds, evens
1200-1200 3 way, odds, evens
1300-1300 3 way, odds, evens
1400-1400 3 way, odds, evens
1500-1500 3 way, odds, evens

1600-1600 3 way, odds, evens
1700-1700 3 way, odds, evens
1800-1800 3 way, odds, evens
1900-1900 3 way, odds, evens
2000-2000 3 way, odds, evens
2100-2100 3 way, odds, evens

2200-2200 3 way, odds, evens
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10000-10000 3 way, odds, evens
10100-10100 3 way, odds, evens
10200-10200 3 way, odds, evens
10300-10300 3 way, odds, evens
10400-10400 3 way, odds, evens
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All the family can join in David Nowotnik's Spectrum bingo program. It produces bingo cards as well as 'calling' the numbers. And it's easy to convert for the ZX81

contains two blocks of 15 numbers, chosen at random within the constraints set by the requirements of a bingo card.

That is, you must have the 15 numbers in a matrix of five columns and three rows. There must be at least one number per column, and numbers are sorted so that there are five numbers per row.

If there is more than one number in a column, they appear

in numerical order down the column. There are two blocks of numbers per card.

Once the card drawing routine on the screen is finished, a copy of it is dumped on the screen to be used by one player. This can be repeated until you have at least one card for each player.

An example of a card is shown in Figure 1.

Once you have all the cards you need, you can start the game. All

Figure 1 — What the bingo cards look like

| | | | | | | |
|----|----|----|----|----|----|----|
| | 23 | 31 | 42 | 53 | | 72 |
| 12 | 32 | 43 | 54 | 65 | 75 | |
| 2 | 45 | | | 52 | 75 | 57 |

| | | | | | | |
|---|----|----|----|----|----|----|
| | 15 | 25 | 31 | 53 | 75 | |
| | | 35 | 44 | 55 | 74 | 52 |
| 5 | | 22 | 43 | 55 | | 59 |

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100 DIM A(15,3)
110 LET P=0:GOTO 1010:GOTO 1000:GOTO 1000
1010 GOTO 1000:GOTO 1000:GOTO 1000
1020 FOR I=0 TO 2
1030 LET A(I,0)=0:GOTO 1040:GOTO 1040
1040 LET A(I,0)=1:GOTO 1050:GOTO 1050
1050 LET A(I,0)=2:GOTO 1060:GOTO 1060
1060 NEXT I
1070 INK 0: PAPER 5: BORDER 5: C
1080 PRINT AT 10,0,"COMPUTER BINGO"
1090 PRINT AT 10,0, "INK 1,"Press
1100 IF A(0,0)=1 THEN GO TO 1010
1110 RANDOMIZE
1120 LET I=0
1130 FOR I=0 TO 2
1140 LET A(I,0)=0:GOTO 1150:GOTO 1150
1150 NEXT I
1160 INK 0: PAPER 5: BORDER 5: C
1170 PRINT AT 10,0,"Computer Bingo"
1180 FOR I=0 TO 2
1190 LET A(I,0)=0:GOTO 1200:GOTO 1200
1200 NEXT I
1210 LET A(0,0)=1:GOTO 1220:GOTO 1220
1220 NEXT I
1230 LET A(1,0)=1:GOTO 1240:GOTO 1240
1240 NEXT I
1250 LET A(2,0)=1:GOTO 1260:GOTO 1260
1260 NEXT I
1270 LET A(3,0)=1:GOTO 1280:GOTO 1280
1280 NEXT I
1290 LET A(4,0)=1:GOTO 1300:GOTO 1300
1300 NEXT I
1310 LET A(5,0)=1:GOTO 1320:GOTO 1320
1320 NEXT I
1330 LET A(6,0)=1:GOTO 1340:GOTO 1340
1340 NEXT I
1350 LET A(7,0)=1:GOTO 1360:GOTO 1360
1360 NEXT I
1370 LET A(8,0)=1:GOTO 1380:GOTO 1380
1380 NEXT I
1390 LET A(9,0)=1:GOTO 1400:GOTO 1400
1400 NEXT I
1410 LET A(10,0)=1:GOTO 1420:GOTO 1420
1420 NEXT I
1430 LET A(11,0)=1:GOTO 1440:GOTO 1440
1440 NEXT I
1450 LET A(12,0)=1:GOTO 1460:GOTO 1460
1460 NEXT I
1470 LET A(13,0)=1:GOTO 1480:GOTO 1480
1480 NEXT I
1490 LET A(14,0)=1:GOTO 1500:GOTO 1500
1500 NEXT I
1510 LET A(15,0)=1:GOTO 1520:GOTO 1520
1520 NEXT I
1530 LET A(16,0)=1:GOTO 1540:GOTO 1540
1540 NEXT I
1550 LET A(17,0)=1:GOTO 1560:GOTO 1560
1560 NEXT I
1570 LET A(18,0)=1:GOTO 1580:GOTO 1580
1580 NEXT I
1590 LET A(19,0)=1:GOTO 1600:GOTO 1600
1600 NEXT I
1610 LET A(20,0)=1:GOTO 1620:GOTO 1620
1620 NEXT I
1630 LET A(21,0)=1:GOTO 1640:GOTO 1640
1640 NEXT I
1650 LET A(22,0)=1:GOTO 1660:GOTO 1660
1660 NEXT I
1670 LET A(23,0)=1:GOTO 1680:GOTO 1680
1680 NEXT I
1690 LET A(24,0)=1:GOTO 1700:GOTO 1700
1700 NEXT I
1710 LET A(25,0)=1:GOTO 1720:GOTO 1720
1720 NEXT I
1730 LET A(26,0)=1:GOTO 1740:GOTO 1740
1740 NEXT I
1750 LET A(27,0)=1:GOTO 1760:GOTO 1760
1760 NEXT I
1770 LET A(28,0)=1:GOTO 1780:GOTO 1780
1780 NEXT I
1790 LET A(29,0)=1:GOTO 1800:GOTO 1800
1800 NEXT I
1810 LET A(30,0)=1:GOTO 1820:GOTO 1820
1820 NEXT I
1830 LET A(31,0)=1:GOTO 1840:GOTO 1840
1840 NEXT I
1850 LET A(32,0)=1:GOTO 1860:GOTO 1860
1860 NEXT I
1870 LET A(33,0)=1:GOTO 1880:GOTO 1880
1880 NEXT I
1890 LET A(34,0)=1:GOTO 1900:GOTO 1900
1900 NEXT I
1910 LET A(35,0)=1:GOTO 1920:GOTO 1920
1920 NEXT I
1930 LET A(36,0)=1:GOTO 1940:GOTO 1940
1940 NEXT I
1950 LET A(37,0)=1:GOTO 1960:GOTO 1960
1960 NEXT I
1970 LET A(38,0)=1:GOTO 1980:GOTO 1980
1980 NEXT I
1990 LET A(39,0)=1:GOTO 2000:GOTO 2000
2000 NEXT I
2010 LET A(40,0)=1:GOTO 2020:GOTO 2020
2020 NEXT I
2030 LET A(41,0)=1:GOTO 2040:GOTO 2040
2040 NEXT I
2050 LET A(42,0)=1:GOTO 2060:GOTO 2060
2060 NEXT I
2070 LET A(43,0)=1:GOTO 2080:GOTO 2080
2080 NEXT I
2090 LET A(44,0)=1:GOTO 2100:GOTO 2100
2100 NEXT I
2110 LET A(45,0)=1:GOTO 2120:GOTO 2120
2120 NEXT I
2130 LET A(46,0)=1:GOTO 2140:GOTO 2140
2140 NEXT I
2150 LET A(47,0)=1:GOTO 2160:GOTO 2160
2160 NEXT I
2170 LET A(48,0)=1:GOTO 2180:GOTO 2180
2180 NEXT I
2190 LET A(49,0)=1:GOTO 2200:GOTO 2200
2200 NEXT I
2210 LET A(50,0)=1:GOTO 2220:GOTO 2220
2220 NEXT I
2230 LET A(51,0)=1:GOTO 2240:GOTO 2240
2240 NEXT I
2250 LET A(52,0)=1:GOTO 2260:GOTO 2260
2260 NEXT I
2270 LET A(53,0)=1:GOTO 2280:GOTO 2280
2280 NEXT I
2290 LET A(54,0)=1:GOTO 2300:GOTO 2300
2300 NEXT I
2310 LET A(55,0)=1:GOTO 2320:GOTO 2320
2320 NEXT I
2330 LET A(56,0)=1:GOTO 2340:GOTO 2340
2340 NEXT I
2350 LET A(57,0)=1:GOTO 2360:GOTO 2360
2360 NEXT I
2370 LET A(58,0)=1:GOTO 2380:GOTO 2380
2380 NEXT I
2390 LET A(59,0)=1:GOTO 2400:GOTO 2400
2400 NEXT I
2410 LET A(60,0)=1:GOTO 2420:GOTO 2420
2420 NEXT I
2430 LET A(61,0)=1:GOTO 2440:GOTO 2440
2440 NEXT I
2450 LET A(62,0)=1:GOTO 2460:GOTO 2460
2460 NEXT I
2470 LET A(63,0)=1:GOTO 2480:GOTO 2480
2480 NEXT I
2490 LET A(64,0)=1:GOTO 2500:GOTO 2500
2500 NEXT I
2510 LET A(65,0)=1:GOTO 2520:GOTO 2520
2520 NEXT I
2530 LET A(66,0)=1:GOTO 2540:GOTO 2540
2540 NEXT I
2550 LET A(67,0)=1:GOTO 2560:GOTO 2560
2560 NEXT I
2570 LET A(68,0)=1:GOTO 2580:GOTO 2580
2580 NEXT I
2590 LET A(69,0)=1:GOTO 2600:GOTO 2600
2600 NEXT I
2610 LET A(70,0)=1:GOTO 2620:GOTO 2620
2620 NEXT I
2630 LET A(71,0)=1:GOTO 2640:GOTO 2640
2640 NEXT I
2650 LET A(72,0)=1:GOTO 2660:GOTO 2660
2660 NEXT I
2670 LET A(73,0)=1:GOTO 2680:GOTO 2680
2680 NEXT I
2690 LET A(74,0)=1:GOTO 2700:GOTO 2700
2700 NEXT I
2710 LET A(75,0)=1:GOTO 2720:GOTO 2720
2720 NEXT I
2730 LET A(76,0)=1:GOTO 2740:GOTO 2740
2740 NEXT I
2750 LET A(77,0)=1:GOTO 2760:GOTO 2760
2760 NEXT I
2770 LET A(78,0)=1:GOTO 2780:GOTO 2780
2780 NEXT I
2790 LET A(79,0)=1:GOTO 2800:GOTO 2800
2800 NEXT I
2810 LET A(80,0)=1:GOTO 2820:GOTO 2820
2820 NEXT I
2830 LET A(81,0)=1:GOTO 2840:GOTO 2840
2840 NEXT I
2850 LET A(82,0)=1:GOTO 2860:GOTO 2860
2860 NEXT I
2870 LET A(83,0)=1:GOTO 2880:GOTO 2880
2880 NEXT I
2890 LET A(84,0)=1:GOTO 2900:GOTO 2900
2900 NEXT I
2910 LET A(85,0)=1:GOTO 2920:GOTO 2920
2920 NEXT I
2930 LET A(86,0)=1:GOTO 2940:GOTO 2940
2940 NEXT I
2950 LET A(87,0)=1:GOTO 2960:GOTO 2960
2960 NEXT I
2970 LET A(88,0)=1:GOTO 2980:GOTO 2980
2980 NEXT I
2990 LET A(89,0)=1:GOTO 3000:GOTO 3000
3000 NEXT I
3010 LET A(90,0)=1:GOTO 3020:GOTO 3020
3020 NEXT I
3030 LET A(91,0)=1:GOTO 3040:GOTO 3040
3040 NEXT I
3050 LET A(92,0)=1:GOTO 3060:GOTO 3060
3060 NEXT I
3070 LET A(93,0)=1:GOTO 3080:GOTO 3080
3080 NEXT I
3090 LET A(94,0)=1:GOTO 3100:GOTO 3100
3100 NEXT I
3110 LET A(95,0)=1:GOTO 3120:GOTO 3120
3120 NEXT I
3130 LET A(96,0)=1:GOTO 3140:GOTO 3140
3140 NEXT I
3150 LET A(97,0)=1:GOTO 3160:GOTO 3160
3160 NEXT I
3170 LET A(98,0)=1:GOTO 3180:GOTO 3180
3180 NEXT I
3190 LET A(99,0)=1:GOTO 3200:GOTO 3200
3200 NEXT I
3210 LET A(100,0)=1:GOTO 3220:GOTO 3220
3220 NEXT I
3230 LET A(101,0)=1:GOTO 3240:GOTO 3240
3240 NEXT I
3250 LET A(102,0)=1:GOTO 3260:GOTO 3260
3260 NEXT I
3270 LET A(103,0)=1:GOTO 3280:GOTO 3280
3280 NEXT I
3290 LET A(104,0)=1:GOTO 3300:GOTO 3300
3300 NEXT I
3310 LET A(105,0)=1:GOTO 3320:GOTO 3320
3320 NEXT I
3330 LET A(106,0)=1:GOTO 3340:GOTO 3340
3340 NEXT I
3350 LET A(107,0)=1:GOTO 3360:GOTO 3360
3360 NEXT I
3370 LET A(108,0)=1:GOTO 3380:GOTO 3380
3380 NEXT I
3390 LET A(109,0)=1:GOTO 3400:GOTO 3400
3400 NEXT I
3410 LET A(110,0)=1:GOTO 3420:GOTO 3420
3420 NEXT I
3430 LET A(111,0)=1:GOTO 3440:GOTO 3440
3440 NEXT I
3450 LET A(112,0)=1:GOTO 3460:GOTO 3460
3460 NEXT I
3470 LET A(113,0)=1:GOTO 3480:GOTO 3480
3480 NEXT I
3490 LET A(114,0)=1:GOTO 3500:GOTO 3500
3500 NEXT I
3510 LET A(115,0)=1:GOTO 3520:GOTO 3520
3520 NEXT I
3530 LET A(116,0)=1:GOTO 3540:GOTO 3540
3540 NEXT I
3550 LET A(117,0)=1:GOTO 3560:GOTO 3560
3560 NEXT I
3570 LET A(118,0)=1:GOTO 3580:GOTO 3580
3580 NEXT I
3590 LET A(119,0)=1:GOTO 3600:GOTO 3600
3600 NEXT I
3610 LET A(120,0)=1:GOTO 3620:GOTO 3620
3620 NEXT I
3630 LET A(121,0)=1:GOTO 3640:GOTO 3640
3640 NEXT I
3650 LET A(122,0)=1:GOTO 3660:GOTO 3660
3660 NEXT I
3670 LET A(123,0)=1:GOTO 3680:GOTO 3680
3680 NEXT I
3690 LET A(124,0)=1:GOTO 3700:GOTO 3700
3700 NEXT I
3710 LET A(125,0)=1:GOTO 3720:GOTO 3720
3720 NEXT I
3730 LET A(126,0)=1:GOTO 3740:GOTO 3740
3740 NEXT I
3750 LET A(127,0)=1:GOTO 3760:GOTO 3760
3760 NEXT I
3770 LET A(128,0)=1:GOTO 3780:GOTO 3780
3780 NEXT I
3790 LET A(129,0)=1:GOTO 3800:GOTO 3800
3800 NEXT I
3810 LET A(130,0)=1:GOTO 3820:GOTO 3820
3820 NEXT I
3830 LET A(131,0)=1:GOTO 3840:GOTO 3840
3840 NEXT I
3850 LET A(132,0)=1:GOTO 3860:GOTO 3860
3860 NEXT I
3870 LET A(133,0)=1:GOTO 3880:GOTO 3880
3880 NEXT I
3890 LET A(134,0)=1:GOTO 3900:GOTO 3900
3900 NEXT I
3910 LET A(135,0)=1:GOTO 3920:GOTO 3920
3920 NEXT I
3930 LET A(136,0)=1:GOTO 3940:GOTO 3940
3940 NEXT I
3950 LET A(137,0)=1:GOTO 3960:GOTO 3960
3960 NEXT I
3970 LET A(138,0)=1:GOTO 3980:GOTO 3980
3980 NEXT I
3990 LET A(139,0)=1:GOTO 4000:GOTO 4000
4000 NEXT I
4010 LET A(140,0)=1:GOTO 4020:GOTO 4020
4020 NEXT I
4030 LET A(141,0)=1:GOTO 4040:GOTO 4040
4040 NEXT I
4050 LET A(142,0)=1:GOTO 4060:GOTO 4060
4060 NEXT I
4070 LET A(143,0)=1:GOTO 4080:GOTO 4080
4080 NEXT I
4090 LET A(144,0)=1:GOTO 4100:GOTO 4100
4100 NEXT I
4110 LET A(145,0)=1:GOTO 4120:GOTO 4120
4120 NEXT I
4130 LET A(146,0)=1:GOTO 4140:GOTO 4140
4140 NEXT I
4150 LET A(147,0)=1:GOTO 4160:GOTO 4160
4160 NEXT I
4170 LET A(148,0)=1:GOTO 4180:GOTO 4180
4180 NEXT I
4190 LET A(149,0)=1:GOTO 4200:GOTO 4200
4200 NEXT I
4210 LET A(150,0)=1:GOTO 4220:GOTO 4220
4220 NEXT I
4230 LET A(151,0)=1:GOTO 4240:GOTO 4240
4240 NEXT I
4250 LET A(152,0)=1:GOTO 4260:GOTO 4260
4260 NEXT I
4270 LET A(153,0)=1:GOTO 4280:GOTO 4280
4280 NEXT I
4290 LET A(154,0)=1:GOTO 4300:GOTO 4300
4300 NEXT I
4310 LET A(155,0)=1:GOTO 4320:GOTO 4320
4320 NEXT I
4330 LET A(156,0)=1:GOTO 4340:GOTO 4340
4340 NEXT I
4350 LET A(157,0)=1:GOTO 4360:GOTO 4360
4360 NEXT I
4370 LET A(158,0)=1:GOTO 4380:GOTO 4380
4380 NEXT I
4390 LET A(159,0)=1:GOTO 4400:GOTO 4400
4400 NEXT I
4410 LET A(160,0)=1:GOTO 4420:GOTO 4420
4420 NEXT I
4430 LET A(161,0)=1:GOTO 4440:GOTO 4440
4440 NEXT I
4450 LET A(162,0)=1:GOTO 4460:GOTO 4460
4460 NEXT I
4470 LET A(163,0)=1:GOTO 4480:GOTO 4480
4480 NEXT I
4490 LET A(164,0)=1:GOTO 4500:GOTO 4500
4500 NEXT I
4510 LET A(165,0)=1:GOTO 4520:GOTO 4520
4520 NEXT I
4530 LET A(166,0)=1:GOTO 4540:GOTO 4540
4540 NEXT I
4550 LET A(167,0)=1:GOTO 4560:GOTO 4560
4560 NEXT I
4570 LET A(168,0)=1:GOTO 4580:GOTO 4580
4580 NEXT I
4590 LET A(169,0)=1:GOTO 4600:GOTO 4600
4600 NEXT I
4610 LET A(170,0)=1:GOTO 4620:GOTO 4620
4620 NEXT I
4630 LET A(171,0)=1:GOTO 4640:GOTO 4640
4640 NEXT I
4650 LET A(172,0)=1:GOTO 4660:GOTO 4660
4660 NEXT I
4670 LET A(173,0)=1:GOTO 4680:GOTO 4680
4680 NEXT I
4690 LET A(174,0)=1:GOTO 4700:GOTO 4700
4700 NEXT I
4710 LET A(175,0)=1:GOTO 4720:GOTO 4720
4720 NEXT I
4730 LET A(176,0)=1:GOTO 4740:GOTO 4740
4740 NEXT I
4750 LET A(177,0)=1:GOTO 4760:GOTO 4760
4760 NEXT I
4770 LET A(178,0)=1:GOTO 4780:GOTO 4780
4780 NEXT I
4790 LET A(179,0)=1:GOTO 4800:GOTO 4800
4800 NEXT I
4810 LET A(180,0)=1:GOTO 4820:GOTO 4820
4820 NEXT I
4830 LET A(181,0)=1:GOTO 4840:GOTO 4840
4840 NEXT I
4850 LET A(182,0)=1:GOTO 4860:GOTO 4860
4860 NEXT I
4870 LET A(183,0)=1:GOTO 4880:GOTO 4880
4880 NEXT I
4890 LET A(184,0)=1:GOTO 4900:GOTO 4900
4900 NEXT I
4910 LET A(185,0)=1:GOTO 4920:GOTO 4920
4920 NEXT I
4930 LET A(186,0)=1:GOTO 4940:GOTO 4940
4940 NEXT I
4950 LET A(187,0)=1:GOTO 4960:GOTO 4960
4960 NEXT I
4970 LET A(188,0)=1:GOTO 4980:GOTO 4980
4980 NEXT I
4990 LET A(189,0)=1:GOTO 5000:GOTO 5000
5000 NEXT I
5010 LET A(190,0)=1:GOTO 5020:GOTO 5020
5020 NEXT I
5030 LET A(191,0)=1:GOTO 5040:GOTO 5040
5040 NEXT I
5050 LET A(192,0)=1:GOTO 5060:GOTO 5060
5060 NEXT I
5070 LET A(193,0)=1:GOTO 5080:GOTO 5080
5080 NEXT I
5090 LET A(194,0)=1:GOTO 5100:GOTO 5100
5100 NEXT I
5110 LET A(195,0)=1:GOTO 5120:GOTO 5120
5120 NEXT I
5130 LET A(196,0)=1:GOTO 5140:GOTO 5140
5140 NEXT I
5150 LET A(197,0)=1:GOTO 5160:GOTO 5160
5160 NEXT I
5170 LET A(198,0)=1:GOTO 5180:GOTO 5180
5180 NEXT I
5190 LET A(199,0)=1:GOTO 5200:GOTO 5200
5200 NEXT I
5210 LET A(200,0)=1:GOTO 5220:GOTO 5220
5220 NEXT I
5230 LET A(201,0)=1:GOTO 5240:GOTO 5240
5240 NEXT I
5250 LET A(202,0)=1:GOTO 5260:GOTO 5260
5260 NEXT I
5270 LET A(203,0)=1:GOTO 5280:GOTO 5280
5280 NEXT I
5290 LET A(204,0)=1:GOTO 5300:GOTO 5300
5300 NEXT I
5310 LET A(205,0)=1:GOTO 5320:GOTO 5320
5320 NEXT I
5330 LET A(206,0)=1:GOTO 5340:GOTO 5340
5340 NEXT I
5350 LET A(207,0)=1:GOTO 5360:GOTO 5360
5360 NEXT I
5370 LET A(208,0)=1:GOTO 5380:GOTO 5380
5380 NEXT I
5390 LET A(209,0)=1:GOTO 5400:GOTO 5400
5400 NEXT I
5410 LET A(210,0)=1:GOTO 5420:GOTO 5420
5420 NEXT I
5430 LET A(211,0)=1:GOTO 5440:GOTO 5440
5440 NEXT I
5450 LET A(212,0)=1:GOTO 5460:GOTO 5460
5460 NEXT I
5470 LET A(213,0)=1:GOTO 5480:GOTO 5480
5480 NEXT I
5490 LET A(214,0)=1:GOTO 5500:GOTO 5500
5500 NEXT I
5510 LET A(215,0)=1:GOTO 5520:GOTO 5520
5520 NEXT I
5530 LET A(216,0)=1:GOTO 5540:GOTO 5540
5540 NEXT I
5550 LET A(217,0)=1:GOTO 5560:GOTO 5560
5560 NEXT I
5570 LET A(218,0)=1:GOTO 5580:GOTO 5580
5580 NEXT I
5590 LET A(219,0)=1:GOTO 5600:GOTO 5600
5600 NEXT I
5610 LET A(220,0)=1:GOTO 5620:GOTO 5620
5620 NEXT I
5630 LET A(221,0)=1:GOTO 5640:
```

SPECTRUM PROGRAM

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000790 IF X=14 OR X=12 THEN GO TO 1200
000795
000800 LET S=20-15=5
000805 DIM C(5,3)
000810 FOR I=1 TO 3
000815 FOR J=1 TO 5
000820 C(I,J)=INT (RAND*(1,15))
000825
000830 IF J=1 THEN GO TO 1200
000835 IF C(I,1)=C(I,2) THEN GO TO 1200
000840
000845 C(I,2)=C(I,3)=C(I,1)+1 OR
000850 C(I,2)=1 THEN GO TO 1120
000855
000860 IF C(I,1)=1 THEN GO TO 1200
000865 FOR J=1 TO 5
000870 C(I,J)=C(I,J)-1
000875
000880 C(I,1)=C(I,1)+1 THEN GO
000885 TO 1200
000890
000895 LET MAX=C(1,1)
000900 LET C(1,1)=C(4,1)+1
000905 LET C(1,2)=1
000910
000915 NEXT J
000920
000925 FOR I=3 TO 2 STEP -1
000930
000935 FOR J=1 TO 3
000940 NEXT J
000945
000950 IF I=2 THEN GO TO 1410
000955 FOR I=1 TO 4
000960 LET V=INT (RAND*5)+1
000965 IF C(I,1)+V THEN GO TO 1200
000970
000975 IF C(I,1)=1 THEN GO TO 14
000980
000985 LET C(I,1)=C(I,1)-1
000990 LET C(I,1)=0
000995
001000 IF I=1 THEN GO TO 1330
001005
001010 LET C(I,1)=C(I,1)
001015
001020 NEXT I
001025
001030 DIM PRINT CARD
001035 FOR I=1 TO 3
001040 IF C(I,1)=0 THEN GO TO 0140
001045
001050 PRINT AT 10,1+100=0,001,C(I,1)
001055
001060 NEXT I
001065
001070 FOR I=1 TO 4
001075 C(I,1)=1 TO 4
001080 C(I,2)=1 TO 5
001085
001090 NEXT I
001095
001100 FOR I=1 TO 15
001105 C(I,1)=4.140+I*0.005
001110 C(I,2)=1
001115
001120 FOR I=1 TO 3
001125 C(I,1)=1 TO 5
001130
001135 IF C(I,1)=0 THEN GO TO 0200
001140
001145 C(I,1)=C(I,1)+1
001150
001155 NEXT I
001160
001165 FOR I=1 TO 5
001170 C(I,1)=1
001175
001180 NEXT I
001185
001190 PRINT AT 0,0,"Another Card"
001195
001200 IF INKEY="n" OR INKEY="N"
001205 THEN GO TO 0000
001210
001215 IF INKEY="y" OR INKEY="Y"
001220 THEN GO TO 0000
001225
001230 INK 0, BORDER 0, BORDER 0, C
001235
001240 PRINT AT 10,0,"COMPUTER SIN
001245
001250 PRINT AT 10,1, BORDER 0, INK
001255
001260 Set ready to start a game
001265
001270
001275
001280
001285
001290
001295
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0000 PRINT " Computer 2"
0001
0002 FOR i=0 TO 8
0003 FOR j=1 TO 12
0004 DOING AT .42+2.j+3-2.j+12
0005 NEXT j
0006 NEXT i
0007 PRINT AT 21.5, "THE 8, PAPER"
0008 "PAPER AND KEY-4 FOR HOUSE C"
0009
0010 LET INKEYS=" "
0011 IF INKEYS THEN GO TO 0100
0012 PRINT AT 21.5, "
0013
0014 IF X#"" OR Y#"" THEN GO TO 0100
0015 LET X=INT (RND*(20-1)+1)
0016 IF (X+Y)-1 THEN GO TO 0100
0017
0018 LET INKEYS=""
0019 PRINT AT 21.4, PAPER 1, INK
0020 "The 2nd1 number is ", FLASH
0021 1.2, FLASH 3
0022 GOTO 0100
0023
0024 LET X=1. GOTO 0100
0025
0026 LET INKEYS=" "
0027 PRINT AT 21.4, PAPER 1, INK
0028 "The 2nd1 number is ", FLASH
0029 1.2, FLASH 3
0030 GOTO 0100
0031
0032 LET X=1. GOTO 0100
0033
0034 LET INKEYS=" "
0035 PRINT AT 21.5, FLASH 1, "HO"
0036 USE CALL 0
0037
0038 GOTO "A Line of Full House"
0039
0040 IF X=1 OR Y=1 THEN GO TO 0100
0041
0042 IF X=1 OR Y=1 THEN GO TO 0100
0043
0044 INPUT "Enter card number ",
0045
0046 FOR i=1 TO 12
0047 IF CODE=21 OR CODE=22 OR CODE=23
0048 THEN GO TO 0100
0049 NEXT i
0050
0051 IF X=1 OR Y=1 THEN GO TO 0100
0052
0053 IF X=1 OR Y=1 THEN GO TO 0100
0054
0055 PRINT AT 21.5, " Checking
0056
0057 LET X=1 OR Y=1
0058
0059 IF X=1 OR Y=1 THEN GO TO 0100
0060
0061 FOR i=1 TO 12
0062 IF CODE=21 OR CODE=22 OR CODE=23
0063 THEN GO TO 0100
0064 NEXT i
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0066 IF X=1 OR Y=1 THEN GO TO 0100
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0096 IF X=1 OR Y=1 THEN GO TO 0100
0097
0098 IF X=1 OR Y=1 THEN GO TO 0100
0099
0100 PRINT AT 21.5, " UP
0101
0102 CALL 1-2
0103
0104 RETURN
0105
0106 PRINT AT 21.5, " OFF
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The spare-time sideline that took off

Richard Shepherd Software has come a long way since, at their first computer fair, Richard and Elaine Shepherd had to stay in a tent. Candice Goodwin met the Shepherds — and John Salthouse, their new manager — at their new offices.



John Salthouse (left), with Elaine and Richard Shepherd — posed on the threshold of something really big?

Sitting in their brand new premises at Elm House, 25 Blenheim Lane, Coppenhall, near Slough, Richard and Elaine Shepherd look as if they don't quite know what has hit them.

Only a few months ago they were selling software at their open-air stall in the dining room of their house in Maidenhead. Now Richard is at the software business full time and Elaine will join him shortly. They have the new office, and two full-time employees. Their program set an odd in Smiths, Monies and other multiples, as well as selling abroad.

But it's really all taken off since the beginning of this year. As Richard put it: "If someone had said to me in January that all this would have happened by the summer, I'd have laughed."

When Richard Shepherd Software first started up 18 months ago, Richard was working as a certified (accountant) and Elaine worked for a public company.

Richard got interested in computers through a job which involved running a computer department. "I asked my company to send me on a programming course, but they wouldn't," he said. "So I decided to buy a ZX81 and a RAMpack, and teach myself."

Meanwhile, on a visit to a friend, Elaine had been shown a controversial version of the Dragonair and Dragonair where main game playing on a home computer. She was so taken with it that she urged Richard to buy an adventure game for his ZX81 — but the game proved to be a big disappointment. "I thought this package we should have a go ourselves," Richard said.

Richard's first effort was a collection of 2500 games and utilities, sold under the name of Rumpus Bytes through small ads in computer magazines. Unfortunately as he was drafted with the arrival of the Spectrum on the scene, and demand for ZX81 fell overnight. There was nothing for it but to buy a Spectrum and try again.

The pair had more luck with Ship of the Line, which Richard says is the first software game ever written for the Spectrum. They took it to the Birmingham computer fair, where they were one of only three companies selling programs for the new machine. Elaine recalled: "When we went to Birmingham, we couldn't afford a hotel, so had to camp. We woke up with a headache the night to find that Smiths had had footprints were sticking the top of the tent."

But despite the primitive conditions, the show generated a lot of interest in Richard Shepherd

Software. With some more of Richard's programs, including the now well-known Transylvanian Tower, plus some written for member local programmers, they graduated to half page ads.

By now it was getting late Christmas, and the program started to sell like hot cakes. "About December 22 we had loads of people writing saying, 'I know it's late, but can you get something to sell,'" said Elaine. "On December 22 we were in the same office and I am. We didn't want to disappoint people."

The big break came with the first order, for Transylvanian Tower, from Smiths. The order came on 22 February — a date that's engraved on Richard and

Elaine's memory. "We'd been sending them samples since before Christmas, and then suddenly we popped that order — an odd just four weeks to get duplicating and colour packaging done", said Elaine.

Transylvanian Tower was enough to set matters back in Smiths' software chain and has stayed in the Top Ten for three months. We didn't really expect it to do so well — but we're stoked," said Elaine.

As that point Richard took the big step of throwing in his job as an accountant completely. Elaine owns the company full time on September 15, but says, "I don't put it 20 to 30 hours a week now."

All the programs in the current catalogue Ship of the Line, Trans-

ylvanian Tower, Everest Ascent, Super Top and Cash Control — were written by Richard.

Unlike the trends of most software companies, who have to advertise in the world of the business, Richard has taken on contracts to run the business for him while he concentrates on programming.

The new recruit in John Salthouse, an old friend of Richard and Elaine's, who went to work as a manager at Debenhams, joining the company two and a half years ago.

He said: "I used to get desperate phone calls saying 'we want to get away from your pattern but it's a mess.' Then we'd record the whole evening talking about computers."

With his previous experience, Salthouse didn't set up a color class of marketing and supervising the work for the various orders. And the bookkeeping is handled by Kate Lawson, another old friend of the Shepherds.

Richard Shepherd Software's main two offerings are Devils of the Deep and Incredible Island. Devils of the Deep is something of a novelty — an algorithm adventure in which you control a diver who goes around a shipwrecked island which is swarmed by a monster.

Incredible Island boasts with complete realism, as then it's written by an outside programmer, Peter Clark. It has a split screen divided between the plot progress and text.

When he has time to get around to it, Richard wants to convert all of the current range of Spectrum games for the Amiga, Dragonair, and possibly Commodore 64.

He'd also like to write games that take advantage of the recently launched Microdrive in the Spectrum — what he can do with a Microdrive, that is.

As he eagerly awaits the letter from Smiths, he said:

Richard and Elaine refuse to get into the game of opening licenses, but the way they are very happy with the way the company is doing financially — particularly in that they've never had to borrow any money.

"We're completely self-financing", said Richard. "I suppose we're overconfident when we get the Smiths order, but we've never had a financial crisis on an order and so on, but it all comes out of what's coming in."

"And it's very nice feeling in the current economic climate to be running a business that can employ people. I'm proud to have created a certain number of jobs."

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RESULTS

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Mr. Chip

FILE 30: GAMES AND UTILITIES

ANALYSIS
This is the classic Post Malone for the 90's with a soft, laid back feel and a heavy, hard-hitting sound. "Sweet Relief" is a beautiful, intimate, and deeply personal song that captures the essence of the artist's life and the struggles of his generation. The lyrics are a mix of vulnerability and strength, and the melody is a perfect blend of melody and harmony. The song is a masterpiece of modern music, and it's a shame that it's not being played on the radio. It's a song that deserves to be heard, and it's a song that will stay with you for a long time. **9.5/10**

Abstract and questions prepared by the following authors, participants at the 8th
 symposium on the use and development of games from the Institute of Design
 (University of Illinois at Chicago) (1990)

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This is a blended with a difference as you step on the water while following paddle trails that give you new skills and challenges. Our instructors have tested your skill, but WUOT (WATER UNITS ONLY) will definitely surprise the senses. Not just paddling, also fun as an entire day! An original experience and challenge. www.wuot.com

There are great games of chance for the PC, or, at least, the computer. Here's a list of ten. All involve random chance and some

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LIQUID WISLEY — This new version of the popular ready mix is

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 (1900) potential variants that make these genealogical changes for the 1900

100. F. J. Beckwith, *Allyl, Homopropyl and Homobutyl*, with discussion by

Unterstützt wird die Führung von Projekten durch eine PMO, welche die Qualität der Projektführung sicherstellt. (17)

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MEALOR FOUNDRIES WELCOMES

How to improve your Spectrum's character

Character making made easy — thanks to David Nowotnik's program for the Spectrum

None of the published programs I've seen so far design new characters on the Spectrum did all that I wanted — and I decided to write my own.

When the program is RUN the user selects which character (a to z) is to be re-designed.

Moving easily that selection, enough to right grid is produced on the screen. This is an enlarged representation of the character again.

You enter which parts you would like turned 'on', by entering row and column numbers (e.g. 23, 56) if you change your mind, and want to turn 'off' a part, simply re-enter the pixel co-ordinates a second time.

When you think you have finished, enter 1. The computer

```

10 DEF LOG:FOR I=1 TO 255
20 DEF @ LOG: D.P. NOWOTNIK
30 DEF
40 LET U=PEEK 23676+256*PEEK 2
50 BORDER 0
60 PRINT AT 4,4,"LOG CHARACTER"
70 FOR J=1 TO 255:PRINT AT 6,6;J:GOTO 100
80 NEXT J
90 PRINT "Which character is to be changed?"
100 FOR I=1 TO 255:PRINT AT 17,17;I:GOTO 100
110 THEN GO TO 60
120 FOR J=1 TO 255:PRINT AT 2,2,"LOG CHARACTER"
130 INPUT I
140 PRINT AT 17,17;I:PRINT AT 4,4;
150 IF I=1 TO 255:PRINT AT 17,17;
160 THEN GO TO 100
170 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
180 NEXT J
190 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
200 NEXT J
210 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
220 NEXT J
230 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
240 NEXT J
250 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
260 NEXT J
270 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
280 NEXT J
290 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
300 NEXT J
310 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
320 NEXT J
330 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
340 NEXT J
350 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
360 NEXT J
370 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
380 NEXT J
390 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
400 NEXT J
410 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
420 NEXT J
430 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
440 NEXT J
450 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
460 NEXT J
470 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
480 NEXT J
490 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
500 NEXT J
510 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
520 NEXT J
530 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
540 NEXT J
550 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
560 NEXT J
570 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
580 NEXT J
590 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
600 NEXT J
610 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
620 NEXT J
630 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
640 NEXT J
650 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
660 NEXT J
670 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
680 NEXT J
690 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
700 NEXT J
710 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
720 NEXT J
730 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
740 NEXT J
750 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
760 NEXT J
770 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
780 NEXT J
790 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
800 NEXT J
810 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
820 NEXT J
830 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
840 NEXT J
850 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
860 NEXT J
870 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
880 NEXT J
890 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
900 NEXT J
910 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
920 NEXT J
930 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
940 NEXT J
950 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
960 NEXT J
970 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
980 NEXT J
990 FOR J=1 TO 255:PRINT AT 2,2;J:GOTO 100
1000 NEXT J

```

spends a few seconds no longer to decimal conversion, then FOR is the appropriate numbers on the UDG storage area, and displays the finished product in normal character size. If, having seen the character, you want to make further changes, the program allows you to do this.

Once you are satisfied, the program gives you the option of designing another character, or stopping.

When you select stop, the program will display all 25 UDGs, one at a time showing you in which eight bytes the character is stored, and the value held by those bytes (a row you want to FORGE in the values from a program using those characters).

Press any key to move onto the next character. Finally, you have the option to save all 25 characters on tape.

It is a common misconception that the Spectrum can only provide 25 user defined graphics characters. By using one of the UDG system variables (mentioned with the variable RAMTOP or the CLEAR command) to create more storage space, it is possible to create several blocks each containing 25 UDGs.

As my program makes use of the system variable UDGs, it is possible to use it to produce more than one block of 25 characters. To do this, enter the program steps, FORGE some values into the two bytes of the system variable UDGs, and to RUN the program.

```

600 GO TO 620
610 PRINT AT 21,21; "AT 21,21," "UD
0 - 255:PRINT AT 21,21;
410 FOR J=1 TO 255:PRINT AT 21,21;J:GOTO 610
420 FOR J=1 TO 255:PRINT AT 21,21;J:GOTO 610
430 FOR J=1 TO 255:PRINT AT 21,21;J:GOTO 610
440 IF J=255 THEN LET J=1
450 IF J=1 THEN LET J=255
460 IF J=255 THEN LET J=1
470 IF J=1 THEN LET J=255
480 IF J=255 THEN LET J=1
490 IF J=1 THEN LET J=255
500 IF J=255 THEN LET J=1
510 IF J=1 THEN LET J=255
520 IF J=255 THEN LET J=1
530 IF J=1 THEN LET J=255
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570 IF J=1 THEN LET J=255
580 IF J=255 THEN LET J=1
590 IF J=1 THEN LET J=255
600 IF J=255 THEN LET J=1
610 IF J=1 THEN LET J=255
620 IF J=255 THEN LET J=1
630 IF J=1 THEN LET J=255
640 IF J=255 THEN LET J=1
650 IF J=1 THEN LET J=255
660 IF J=255 THEN LET J=1
670 IF J=1 THEN LET J=255
680 IF J=255 THEN LET J=1
690 IF J=1 THEN LET J=255
700 IF J=255 THEN LET J=1
710 IF J=1 THEN LET J=255
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730 IF J=1 THEN LET J=255
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870 IF J=1 THEN LET J=255
880 IF J=255 THEN LET J=1
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910 IF J=1 THEN LET J=255
920 IF J=255 THEN LET J=1
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940 IF J=255 THEN LET J=1
950 IF J=1 THEN LET J=255
960 IF J=255 THEN LET J=1
970 IF J=1 THEN LET J=255
980 IF J=255 THEN LET J=1
990 IF J=1 THEN LET J=255
1000 IF J=255 THEN LET J=1

```



Top Ten programs for the Dragon-32

- | | | |
|----|---------------------------|----------------|
| 1 | The King | Microdeal (2) |
| 2 | Space War | Microdeal (1) |
| 3 | Andrew Arcoak | Microdeal (3) |
| 4 | Crozier | Belamander (4) |
| 5 | Nightflight | Microdeal (5) |
| 6 | Planet Invasion | Windsurf (6) |
| 7 | Dragon Trek | Peritech (8) |
| | Chumpeas | Microdeal (1-) |
| 8 | Morocco Grand Prix | Microdeal (7) |
| | Cultivent: Snow Whiteborn | Microdeal (10) |
| 9 | Space Shuttle Simulator | Dragon (1-) |
| 10 | Typing Tutor | |

Compiled by Scott. Figures in brackets are last week's positions.

Top Ten programs for the Spectrum

- | | | |
|----|-----------------------|----------------------|
| 1 | Flight Simulation | Piran (1) |
| 2 | Jeri Pao | Ultimate (2) |
| 3 | Mad Martha | Microgen (3) |
| 4 | Horses and the Spoken | Piran/M. House (4) |
| 5 | Super Saw | Richard Shepherd (5) |
| 6 | Marine Miner | Box Byte (7) |
| 7 | Post | Ultimate (1-) |
| 8 | Transylvanian Tower | Richard Shepherd (4) |
| 9 | Pacemaker | Melkamu House (1-) |
| 10 | Ali Dabburn | Imagier (1-) |

Compiled by M. M. Smith. Figures in brackets are last week's positions.

Top Ten programs for the ZX81

- | | | |
|----|--------------------|---------------------|
| 1 | Space Raiders | Smile (1) |
| 2 | Spacejungle Island | Smile (2) |
| 3 | Flight Simulation | Smile (4) |
| 4 | History | Smile (1-) |
| 5 | Geography | Smile (1-) |
| 6 | Football Manager | Addictive Games (3) |
| 7 | 1K Games | Smile (5) |
| 8 | Defender | Quikdrive (7) |
| 9 | Fantasy Games | Smile (10) |
| 10 | Scramble | Quikdrive (6) |

Compiled by Scott. Figures in brackets are last week's positions.

Top Ten programs for the VIC-20

- | | | |
|----|----------------|----------------|
| 1 | Assault | Imagier (1) |
| 2 | Wacky Waters | Imagier (2) |
| 3 | Comixids | Big Byte (4) |
| 4 | Sargon 2 Chess | Commodore (1-) |
| 5 | Peris | Big Byte (3) |
| 6 | Skylark | Comixids (1-) |
| 7 | Cosmic Smack | Imagier (5) |
| 8 | Cosmic Crunch | Commodore (1-) |
| 9 | Excite MCP | Hudson (6) |
| 10 | Cyclone | Bubble (7) |

Compiled by Scott. Figures in brackets are last week's positions.

Micros go to school in Minnesota

Just about everyone in this country knows an student in education of computing. You know about NREC (Minnesota Educators Computing Consortium) which was the first organization to achieve for adequate and market quality educational software for use, primarily, in schools.

It should therefore come as little surprise to find that over 15 per cent of the schools in Minnesota have computers on their shelves being used for serious school purposes.

Quint Education Inc. (5044), a Denver, Colorado-based research firm, estimates that 18,000 schools in the U.S. to obtain information on computer usage. They compiled data on existing schools.

For example, almost 80% believe 2,000 of the schools in the U.S. will have a micro, possible and installed in the next five years of technology, but almost a quarter of all schools.

Some differences between regions of Minnesota were found. Computers are a large share of the school in use in New England, and fairly big in the south-western portion of the country.

A company called *Smile* has just introduced its *Smile 2000* Program as an expansion and to work with the Coloco, Atari, Sega, and Commodore video game playing machines. It contains 24 of A.M.M. M of video A.M.M. and 24 of 400M including a BASIC interpreter. It is expandable to 144K and is controlled by a 2804. It also a processor style keyboard with one user-definable function key and separate control keys. It carries a list price of \$122.

If you own either an Atari 400 or 600 and wish to look up a printer which can a Commodore-compatible interface, you might be interested in this. *Interface No. 1* allows such a connection using controller jacks J1 and J4. A printer loader program is provided that loads the interface in disk, replaces the printer loader, and takes up under 128 bytes of user memory while remaining compatible with all Atari games and programs. This small little device costs of \$85 and is available from *Leading Glen Microproducts, P.O. Box 304, Loveland Colorado 80537, (303) 669-2641*.

If you own a VIC-20, Commodore 64 or Tandy/Declar 1000 take a look at a group of five new games and programs on cassette and/or floppy that seem to be somewhat out of the ordinary, and are packaged very professionally.

For example, *Time and Money Manager* is a program which helps a part of financial and scheduling software designed to help you plan wisely how best to spend your time as well as help you make solid financial decisions. *OTCQ2* is a professional program which teaches you how to develop your own credit plans.

Illustrated you gain theory, programming, logic, and graphics techniques, and it requires no previous programming knowledge or experience. The rest of the product line looks equally interesting, appropriate to other unique problems. If you would like more information, send an inquiry to *Almond Engineering Software, 71 Park Lane, Brea CA 92603, (714) 662-4133*. I believe it will be well worth it.

That's it for this week.
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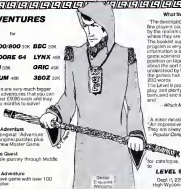
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